

## **REMARKS**

Claims 1 - 27 are now pending in the application. Claims 1, 2, 5, 7, 8, 11, 15, and 16 have been rejected under 35 U.S.C. §102(b). Claims 3, 4, 6, 9, 10, 12, 13, 14, 17, and 18 have been rejected under 35 U.S.C. §103(a). Claims 1, 2, 7, 8, 13, 15, and 16 are amended. Claims 19-27 are added. No new matter is presented. The above amendments and the following remarks are considered by Applicants to overcome each rejection raised by the Examiner and to place the application in condition for allowance. An early Notice of Allowance is therefore requested.

### **I. Objection to the Specification**

The Abstract was objected to for being in improper format. The Abstract is amended to overcome the cited informalities. In view of this Amendment to the abstract, Applicants request the withdrawal of the objection to the specification.

### **II. Rejection of pending claims 1, 2, 5, 7, 8, 11, 15, and 16 under U.S.C. 102(b) as being anticipated by Takahashi (U.S. Patent No. 6,099,103).**

#### **A. Summary of Cited Reference**

Takahashi discloses an ink-jet apparatus and a driving method thereof which prevents variations in an ink jet velocity caused by variations in ambient temperature. Takahashi discloses a first, second and third pulse signals. The third pulse signal is used for compensating for variations in a residual pressure within the ink flow passage that occurs after the ink has been ejected.

#### **B. Argument**

The Examiner takes the position that Takahashi teaches or suggests all the features recited in claims 1, 2, 5, 7, 8, 11, 15, and 16. Applicants respectfully disagree.

It is respectfully submitted that Takahashi fails to teach or suggest an ejection of the pulse signal that increases the volume of the liquid containing chamber to cause ejection of a droplet, and subsequently only one additional pulse signal that increases the volume of the liquid containing chamber to pull back a part of the droplet about to be ejected.

In contrast to the claimed invention Takahashi provides a jet pulse signal which pushes out the ink in the ink chamber, however, a part of the ink droplet is pulled back in

accordance with the first additional pulse signal, as a non-jet pulse signal is applied following the jet pulse signal, whereby the ejected ink droplet which is being ejected becomes smaller. A second additional signal is then applied which is used to stabilize the next ink ejection, hence causing the prevention of the drop in ink droplet speed. However, a volume of liquid to protrude from the nozzle on completion of the application of the ejection pulse signal can be reduced and a droplet to be ejected can have an even smaller volume than the volume of the liquid that has protruded from the nozzle with only an additional pulse in this application. In other words, after the jet pulse signal is applied, two additional signals are required in the teaching of Takahashi. (See Column 3, Lines 20-43).

In contrast to the teaching of Takahashi, the claimed invention provides an ejection pulse signal that increases the volume of the liquid containing chamber to cause ejection of a droplet, and subsequently only one additional pulse signal that increases the volume of the liquid containing chamber to pull back a part of the droplet about to be ejected. Thus, in the claimed invention, the ink is stably ejected since an ejection of a minute droplet with a relatively high speed can be applied. See Paragraph [0009], [0038] – [0041]. As a result, a volume of the ejected droplet can be reduced and the droplets are stably ejected from the nozzles with only two pulses in total in the claimed invention.

Takahashi, however, requires three pulses. It should be noted that less pulses are more optimal for a printing cycle, which is the period of time that the printer feeds paper from a particular dot. Thus, in other words, the claimed invention provides minute ink droplets while maintaining high speed ejection with only two pulses. In contrast, Takahashi teaches utilizing three or more pulses. Therefore it is respectfully submitted that Takahashi fails to teach or suggest an ejection of the pulse signal that increases the volume of the liquid containing chamber to cause ejection of a droplet, and subsequently only one additional pulse signal that increases the volume of the liquid containing chamber to pull back a part of the droplet about to be ejected.

In view of the above distinction, Applicants respectfully request the withdrawal of the rejection of claims 1, 7, and 15 under 35 U.S.C. 102(b).

Claims 2, 5, 8, 11, and 16 are dependent upon claims 1, 7, and 15. Therefore, it is submitted that these claims also recite patentable subject matter for at least the reasons mentioned above. Accordingly, Applicants also request the withdrawal of the rejection of claims 2, 5, 8, 11, and 16 under 35 U.S.C. 102(b).

**III. Rejection of pending claims 3, 9, and 17 under U.S.C. 103(a) as being unpatentable over Takahashi (U.S. Patent No. 6,099,103).**

**A. Argument**

Claims 3, 9, and 17 are dependent upon claims 1, 7, and 15. Takahashi fails to teach or suggest an ejection of the pulse signal that increases the volume of the liquid containing chamber to cause ejection of a droplet, and subsequently only one additional pulse signal that increases the volume of the liquid containing chamber to pull back a part of the droplet about to be ejected. Therefore, it is submitted that claims 3, 9, and 17 recite patentable subject matter for at least the reasons mentioned above. Applicants request the withdrawal of the rejection of claims 3, 9, and 17 under 35 U.S.C. 103(a).

**IV. Rejection of pending claims 4, 10, and 18 under U.S.C. 103(a) as being unpatentable over Takahashi (U.S. Patent No. 6,099,103) in view of Okuda et al. (U.S. Patent No. 6,705,696).**

**A. Summary of Cited References**

Okuda discloses a method for driving an inkjet recording head designed to eject an ink droplet via an ink nozzle communicated to a pressure chamber filled with ink by generating a pressure wave in the pressure chamber by applying a driving voltage to a piezoelectric actuator. More specifically, Okuda discloses performing a minute-drop ejection, wherein the inherent period of the pressure wave is set on the order of 3 to 5 microseconds. (See Column 3, Lines 58-63).

The Examiner takes the position that the combination of the cited references teaches or suggest the features recited in claims 4, 10, and 18. Applicants respectfully disagree.

As discussed above, Takahashi fails to teach or suggest an ejection of the pulse signal that increases the volume of the liquid containing chamber to cause ejection of a droplet, and subsequently only one additional pulse signal that increases the volume of the liquid containing chamber to pull back a part of the droplet about to be ejected. Okuda does not cure the deficiencies of Takahashi. Therefore, it is submitted that claims 4, 10 and 18 recite patentable subject matter for at least the reasons mentioned above. Applicants request the withdrawal of the rejection of claims 4, 10, and 18 under 35 U.S.C. 103(a).

**V. Rejection of pending claims 6 and 12 under U.S.C. 103(a) as being unpatentable over Takahashi (U.S. Patent No. 6,099,103) in view of Takahashi (U.S. PUB. 2001/0043241).**

**A. Argument**

Claims 6 and 12 are dependent upon claims 1 and 7. Takahashi fails to teach or suggest an ejection of the pulse signal that increases the volume of the liquid containing chamber to cause ejection of a droplet, and subsequently only one additional pulse signal that increases the volume of the liquid containing chamber to pull back a part of the droplet about to be ejected. Therefore, it is submitted that claims 6 and 12 recite patentable subject matter for at least the reasons mentioned above. Applicants request the withdrawal of the rejection of claims 6 and 12 under 35 U.S.C. 103(a).

**VI. Rejection of pending claims 13 and 14 under U.S.C. 103(a) as being unpatentable over Takahashi (U.S. Patent No. 6,099,103) in view of Junhua (U.S. Publication 2003/0085962).**

**A. Argument**

The Examiner takes the position that the combination of the cited references teaches or suggest the features recited in claims 13 and 14. Applicants respectfully disagree.

It is respectfully submitted that neither Takahashi nor Junhua teach or suggest an ejection of the pulse signal that increases the volume of the liquid containing chamber to cause ejection of a droplet, and subsequently only one additional pulse signal that increases the volume of the liquid containing chamber to pull back a part of the droplet about to be ejected. Junhua does not cure the deficiencies of Takahashi. Therefore, it is respectfully submitted that claim 13 and 14 recite patentable subject matter for at least the reasons mentioned above. Therefore, Applicants request the withdrawal of the rejection of claims 13 and 14 under 35 U.S.C. 103(a).

**VII. New Claims**

Claims 19-27 are added. No new matter is presented. The subject matter recited in claims 19-27 are disclosed in Figures 3, 4, 6, and 7 and in the specification. Claims 19-27 are dependent upon independent claims 1, 7, and 15. Therefore, Applicants respectfully submit that claims 19-27 recite subject matter that is patentable for at least the reasons mentioned

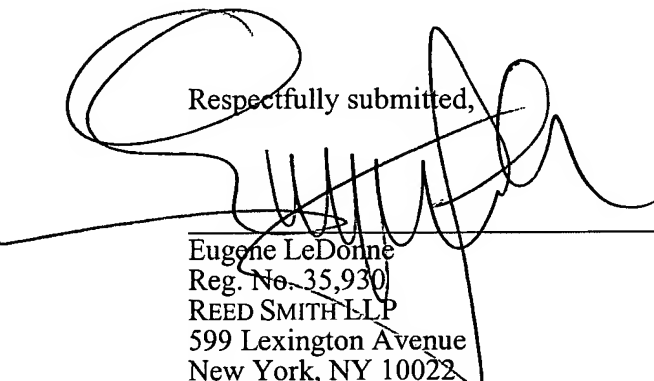
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above. In view of the above amendments, Applicants request the favorable consideration of claims 19-27.

### **VIII. Conclusion**

In view of the above amendments and remarks, Applicant submits claims 1-27 recite subject matter that is neither taught nor suggested by the applied references. The specification is amended. Claims 1, 2, 7, 8, 13, 15, and 16 are amended. Claims 19-27 are added. No new matter is presented. Thus, for the reasons presented above, claims 1-27 are believed by Applicant to define patentable subject matter and should be passed to issue at the earliest possible time. A Notice of Allowance is requested.

Respectfully submitted,



Eugene LeDonne  
Reg. No. 35,930  
REED SMITH LLP  
599 Lexington Avenue  
New York, NY 10022  
(P) 212-521-5402  
Attorney for Applicant